DOCUMENT RESUME

ED 336 883 EC 300 615

AUTHOR Stahl, Agneta
TITLE Providing Transportation for the Elderly and Handicapped in Sweden: Experiences Gained and Future Trends. TFB-Report 1991:17.
INSTITUTION Lund Univ. (Sweden). Dept. of Traffic Planning and Engineering.; Swedish Transport Research Board, Stockholm.
REPORT NO ISBN-91-87246-81-3; ISSN-0282-8014
PUB DATE 91
NOTE 30p.
AVAILABLE FROM Allmanna Forlaget, Customer Service, S-106 47 Stockholm, Sweden (for this document); Swedish Transport Research Board (TFB), Birger Jarls torg 5, S-111 28, Stockholm, Sweden (for appendixes to this document).
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Accessibility (for Disabled); Adults; *Bus Transportation; Design Requirements; *Disabilities; Foreign Countries; Older Adults; *Physical Disabilities; Physical Mobility; Research and Development; *Transportation; Wheelchairs
IDENTIFIERS *Sweden

ABSTRACT

This report summarizes results of research and development projects concerning disabled and elderly people and transportation services carried out at the Department of Traffic Planning and Engineering in Lund, Sweden. This summary is based on 12 previous reports. The first section examines Swedish policy which stresses enabling elderly and disabled people to live as normally as possible in their home environments. Policy components include requiring adaptation of public transport vehicles and local terminals to the needs of the disabled, provision of special transportation services, and an overall community-responsive public transportation system which meets individual needs. Components of such a system are then considered in more detail including the population needing special consideration, the traditional fixed route service, the service route concept (special routes and fully accessible smaller busses); and the Special Transportation Service (a demand based service for the most severely disabled). Discussed in the next section is the provision of accessible public transportation in the future (possibly the development and wide use of low-floor standard buses). Includes 18 references. The 8 appendixes (earlier reports published separately) are available from the Swedish Transport Research Board. (DB)

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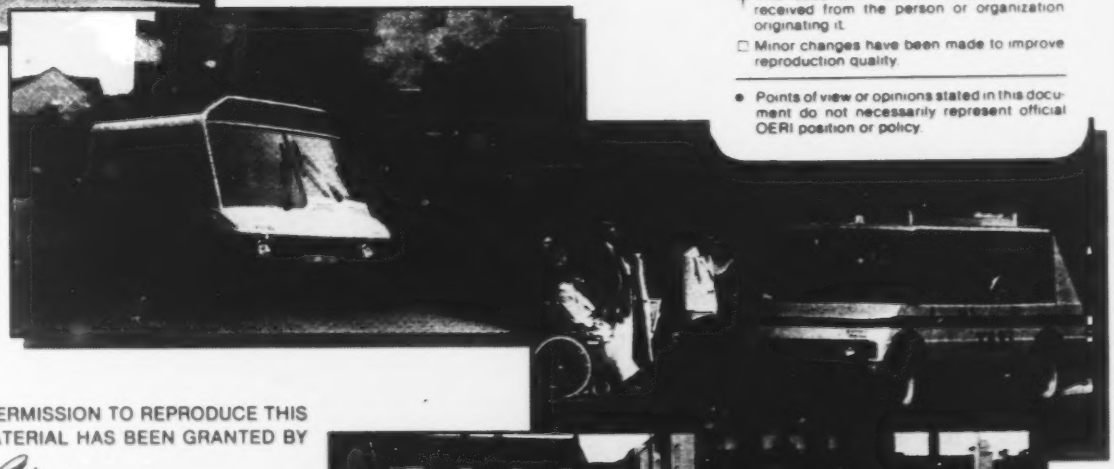
Swedish Transport Research Board

Agneta Ståhl

Providing Transportation for the Elderly and Handicapped in Sweden



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Experiences Gained and Future Trends

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TFB–report 1991:17

FÖRFATTARE/AUTHOR	SERIE/SERIES	NR/NO
Agneta Ståhl, Lund Institute of Technology	TFB-Report	1991:17
TITEL/TITLE Providing Transportation for the Elderly and Disabled in Sweden. Experiences Gained and Future Trends	ISBN 91-87246-81-3 ISSN 0282-8014 PUBLICERINGSDATUM/DATE OF PUBLISHING May 1991	
TFBs DNR 87-206-62	UTGIVARE/PUBLISHER Swedish Transport Research Board, Stockholm, Sweden	

REFERAT (SYFTE, METOD, RESULTAT)

ABSTRACT (AIM, METHOD, RESULTS)

Throughout the 1980s, the Department of Traffic Planning and Engineering of the Lund Institute of Technology has conducted research into the adaptation of public transportation to the elderly and disabled. This research has been financed by the Swedish Transport Research Board and its predecessors, and by local transportation companies.

The research effort at the Department of Traffic Planning and Engineering has been based on current Swedish legislation governing this field, and has concentrated primarily on ascertaining how the users, i.e. elderly and disabled people, have been affected by the legislation and other, local, initiatives to adapt public transportation.

This report is a synopsis of the results of research and development projects concerning disabled people and transportation carried out at the Department of Traffic Planning and Engineering in Lund.

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INSTITUTIONEN FÖR TRAFIKTEKNIK
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LUNDS UNIVERSITET

Swedish Transport Research Board

Agneta Ståhl

Providing Transportation for the Elderly and Handicapped in Sweden

Experiences Gained and Future Trends

TFB–report 1991:17
Subject field:
Public Transport
(Kollektivtrafik)

Libergraf 741 1 004
Gotab 93682, Stockholm 1991

Preface

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The present synopsis is based upon the following reports.

Ståhl, A, 1983. ***(Special Transportation Service in Communities.*** Regulations and Measures for Improvements in STS.) English summary in Appendix 1.

Ståhl, A, 1983. ***(Adaptation of Buses to the Disabled In Accordance With the Directives of the Swedish Board of Transport).*** English summary in Appendix 2.

Ståhl, A, 1984. ***(Improved Bus Travel for the Elderly.*** Experiments Conducted in Gävle). English summary in Appendix 3.

Andersson, P.G. et al, 1986. (***Bus Stops with Highlevel Platforms in Halmstad).*** English summary in Appendix 4.

Ståhl, A, et al, 1986. ***(Possibilities of Meeting Some of the Demand for Special Transportation Service in the Public Transportation System).*** English summary in Appendix 5.

Ståhl, A, et al, 1987. ***(Orion and Neoplan Buses as Service Route Vehicles.*** Interviews with Passengers in Borås).

Ståhl, A, et al, 1988. ***(Effects of a New Service Route in Borås).*** English summary in Appendix 6.

Ståhl, A, 1988. ***(Development of Improved Boarding and Debarking for Elderly Passengers on a City Bus).*** English summary in Appendix 7.

Ståhl, A, et al, 1989. ***(The Renault-Master Bus as a Service Route Vehicle.*** Interviews with Passengers in Borås).

Ståhl, A, et al, 1989. ***(Service Route Traffic in the Municipality of Mark).***

Ståhl, A, 1990. ***(Consistent Kneeling at All Bus Stops. An Experiment in Gävle).*** English summary in Appendix 8.

Ståhl, A, et al, 1990. ***(Interviews with Passengers and Drivers Concerning Service Route Traffic in Stockholm).***

Agneta Ståhl, Doctor of Engineering, has been Director of Research in this field at the Department of Traffic Planning and Engineering throughout the 1980s.

Lund, January 1991

Agneta Ståhl

The appendices referred to in this preface are published separately. To obtain your copy, please contact The Swedish Transport Research Board – TFB.
Address and phone/fax-numbers on back cover.

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APPENDICES (Published separately. To obtain your copy, please contact The Swedish Transport Research Board – TFB. Address and phone/fax numbers on back cover):

1 Special Transportation Service in Communities. Regulations and Measures for Improvements in STS
2 Adaptation of Buses to the Disabled In Accordance With the Directives of the Swedish Board of Transport
3 Improved Bus Travel for Elderly. Experiments Conducted in Gävle
4 Bus Stops as Highlevel Platforms in Halmstad
5 Possibilities of Meeting some of the Demand for Special Transportation Service in the Public Transportation System
6 Effects of a New Service Route in Borås
7 Development of Improved Boarding and Debarking for Elderly Passengers on a City Bus
8 Consistent Kneeling at All Bus Stops. An Experiment i Gävle

PROVIDING TRANSPORTATION FOR THE ELDERLY AND DISABLED IN SWEDEN

Experiences Gained and Future Trends

1 SWEDISH POLICY

In its continuing effort to improve the quality of life for all of its inhabitants, Sweden is committed to enabling elderly and disabled people to live in their home environments. Despite disabilities, people should be able to live "normal" lives and be integral parts of their community. The opportunity to travel is thus crucial. If the disabled and the elderly are to participate in different social activities, then communications and the environment must support their needs for mobility. However, we know that the disabled do not have the same opportunity to move around as do others. The traffic environment, the physical surroundings in general, and the means of transportation themselves all present obstacles to those with mobility impairments.

Therefore, a key traffic policy goal in Sweden is good accessibility to transportation services for ***all*** inhabitants. This means that everyone, even the disabled, should be offered equitable and satisfactory transportation, and the opportunity to participate in work and social life. People with functional impairments should, to the extent possible, be integrated in the community and be offered living conditions similar to those of other citizens.

Sweden's goals emerged during the 1970's and 1980's in national discussions about the situation of the disabled. Extensive research and development efforts were also made to arrive at practical solutions to facilitate travel for people with disabilities.

Sweden, like most other countries in the Western world, offered ***Special Transportation Services (STS)*** as an initial approach to solving the transportation problems of the disabled. Special Transportation Services were introduced in Sweden at the end of 1960's. Initially, STS was conducted on a volunteer basis, but municipalities gradually assumed responsibility for providing this service. The concept spread rapidly during the 1970's, and since 1979 all Swedish municipalities have offered STS. In 1974, Parliament decided to introduce national subsidization, which today reimburses a maximum of 35% of a municipality's total costs.

The purpose of STS is to make transportation available to people who have difficulties using conventional public transit. Thus, at the outset Swedish policy created a ***separate*** transportation system for the elderly and disabled. During the late 1970's, however, this thinking changed. Today the goal of Swedish policy regarding disabled people and the elderly can be summarized in two words - ***integration*** and ***normalization.***

To be able to achieve this goal, Sweden implemented legislation in 1979 requiring the gradual ***adaptation of public transport vehicles and local terminals*** to the needs of the disabled and elderly. One reason behind the legislation was the rapid expansion of STS

and the costs for this service. But there was also an increasing political pressure to allow for complete integration of everyone in the community. This means that Sweden today has ***mandatory legislation*** that includes ***both*** Special Transportation Service ***and*** the adaptation or vehicles used in public transportation.

Based on experiences gained from research into public transportation as well as from various local initiatives during the past decade, a new philosophy has been developed in Sweden for providing overall public transportation in urban areas. Today, transit authorities believe that public transportation must be ***market-adapted.*** Applying this concept in practice means that the bus company cannot offer one and the same route network to all consumer groups. Different groups make such different demands on public transportation that a differentiation of the route network is necessary. The transportation service must be adapted to each individual community, with specific attention paid to a person's physical limitations, origin and destination of the person's travel, and the individual care and attention that the passenger may require.

This recognition resulted in, among other things, the development of ***Service Route Traffic.*** The Service Route network places priority on bringing bus service as close as possible to the residents, whereas the conventional basic route network is usually constructed in the form of straight radial lines which quickly connect different residential areas with downtown centers. This means that the Service Routes wind through different residential areas, which in turn means that the distance to the bus stop (and hence the bus) is rather short. In addition, the bus drives up to the entrance of service centers and various health facilities. Thus, Service Routes become an attractive means of transportation for people with various disabilities, and constitute one important component of a differentiated, and community-responsive, public transportation route network.

With regard to elderly and disabled people, the developments during the last decade have produced a Swedish policy today which assumes that ***no community can be fully served with a single transportation mode.*** Two important assertions can be made. ***First,*** some people are so seriously handicapped that they require special services. ***Secondly,*** less seriously disabled people can travel by public transportation if equipment and facilities are adapted to the needs of the user group.

Therefore, Swedish policy today also recognises that the adaptation of existing 12-meter (40-foot) buses with lifts and other facilities is ***not*** the best and only solution for all people with various disabilities. The difficulties encountered by people with a mobility handicap vary so much that different solutions are necessary. This means that it is not sufficient to adapt the public transportation system ***solely*** by making technical improvements in vehicles. The difficulties encountered by people with a mobility handicap require achieving awareness of, and understanding for, what it means to grow older or suffer disabilities, difficulties that create the need for a little extra time for coping with particular elements of the system. In other words, in addition to technical improvements, there is also a need for better service. It is also important to consider all the problems that one might encounter along the entire route when using public transportation:

- ***on the way to and from the bus stop and at the bus stop***
- ***boarding and alighting from the vehicle***
- ***during the ride***

The recognition described above has resulted in a new design, as ***Community-responsive Public Transportation*** for urban areas, where specific attention is paid to the needs of elderly and disabled persons, consisting of:

First, Traditional Fixed Route Service

This service, utilizing standard 12 meter (40-foot) buses, supports the needs of mass transportation for people with little or no mobility limitation. To facilitate getting on and off, these vehicles, under Swedish law, are relatively accessible, if some service-oriented measures are introduced.

Secondly, Service Routes

This regular public transportation system serves mainly elderly and disabled people who cannot cope with public transportation involving large vehicles, long distances to and from the bus stop, and the stresses encountered during the trip. These people either do not presently use public transportation, or can only use it with great difficulty.

Thirdly, Special Transportation Service

This service will be available for people who are so seriously handicapped that they require door-to-door transportation services and more personal assistance.

A ***Community-Responsive Public Transportation*** system means that each system can better meet the varying needs of different individuals with impaired physical strength and/or mental capacity. It also makes it possible for people to be integrated in the public transportation system to a greater extent and up to a greater age. The thinking behind this new initiative to offer appropriate transportation to the elderly and disabled, and a description of the systems involved, are outlined below.

2 A COMMUNITY-RESPONSIVE PUBLIC TRANSPORTATION SYSTEM

2.1 Who needs consideration? and how?

The 1979 law which required gradual adaptation of public transport vehicles and terminals was based on the investigation conducted by a special commission called the HAKO Commission. Their study defines a disabled person as ***"anyone who, due to impaired physical or mental capacity, cannot use existing public transportation services, and who encounters substantial difficulties related to mobility and travel".***

Based on this definition, it is estimated that approximately one million people in Sweden, approximately 12-13% of the population, are disabled in some way with regard to getting around out of doors. This population can be grouped as follows:

*	***Serious mobility impairment***	***250,000***
*	***Other disabilities causing obvious difficulty in travelling***	***250,000***
*	***Other disabilities which restrict one's ability to travel***	***500,000***

In addition to these groups, approximately another one million persons are estimated to have more difficulty than fully active people in using public vehicles. Here we find, for example, many older people whose advancing age results in diminished physical and mental capacity.

Research during the past decade has shown that it is evident that a majority of elderly and other people with a disability would be able, and would indeed prefer, to use public transportation if this system were adapted and designed to meet their needs.

However, despite the legislation, the conventional public transportation system in Sweden is not yet sufficiently adapted to permit access by large numbers of those people who are entitled to use STS. It is important to consider ***all*** of the problems that one might encounter along the ***entire*** route when using public transportation.

People with a mobility impairment who use public buses in an urban area encounter a range of problems throughout the entire travel chain. Problems occur ***on the way to and from the bus stop, or at the bus stop*** - e.g. long distances to walk, poor snow removal or sanding, uneven sidewalks or badly maintained pedestrian passageways, and inadequate wind and rain protection and seating facilities at the bus stop itself.

Another category of problems involves ***boarding and alighting*** from the vehicle. The bus may have high steps or poorly designed railings, or the automatic doors may malfunction, etc. Furthermore, the bus may not drive in close enough to the curb at a bus stop.

Problems may also occur ***during the ride.*** Some people may not have time to sit down before the bus starts moving. They may be uncertain whether to exit through the front

or back door. A poor PA system or other factors may result in poor information, or unintelligible stop announcements. Problems like these mean that bus travel becomes difficult, or even impossible, for people with diminished capacities.

The awareness of the range and variety of problems listed above has led to the current trend in Sweden regarding the provision of transportation for the elderly and handicapped. Today it is recognized that merely adapting the existing 12-meter (40-foot) buses is not the best solution for a great proportion of the elderly and disabled people. Meeting all their needs cannot be achieved by this expedient. The attitude in Sweden today,therefore, emphasizes a kind of differentiated system in which you are able to choose when your needs gradually so require. The philosophy behind this thinking is to try to enable the elderly and the disabled to use each system longer, which will not only mean reduced demand for Special Transportation Service but, above all, offer these people an extended ***freedom of choice*** and prolonged ***integration*** in society.

This ***Community-responsive Public Transportation*** system consists of three levels and is operated with three different types of vehicles:

* ***Traditional Fixed Route Service*** operated with standard 12-meter (40-foot) buses designed according to Swedish law.

* ***Service Routes*** operated with smaller 6-8-meter (20-26-foot) buses fully accessible with a low floor (300-350 mm [12-14"]).

* ***Special Transportation Service*** operated with taxis or vans (low-floor vehicles) fully accessible to wheelchair passengers.

2.2 Traditional Fixed Route Service

Description

The ***first level*** in the provision of a Community-responsive Public Transportation is the ***Fixed Route Service,*** which is the ordinary mainstream public transportation in Swedish urban areas. This system is generally operated with standard 12-meter (40-foot) buses.

Based on the requirements decreed in the 1979 legislation, the Swedish Board of Transport issued their first regulations in early 1982. These regulations apply to the manufacture of buses in 1984 and thereafter. For buses operating in urban areas, the regulations stipulate:

* ***the height of steps;*** the first step above street level is not to exceed 230 mm (9") at one entrance of the vehicle

* ***the width of doorways;*** the width of the front door must be at least 700 mm (28")

* ***the design and function of the handrails***; must be in round or oval form and contrast-painted

* ***the height of figures and letters on destination signs;*** the height must be 250 mm (10")

* ***the placement of seats;*** seats intended specifically for the disabled and elderly must be placed in the front of the bus

* ***announcing bus stops;*** equipment to announce bus stops must be available in the vehicle

Even though the bus companies have been required to adapt their buses for several years now, and even though many of the regulations do not require extensive efforts on the part of the companies, the implementation of these regulations has not yet proceeded very rapidly. Since buses are in service about 15 years, it will take another 10 years until all buses used in urban traffic comply with the regulations.

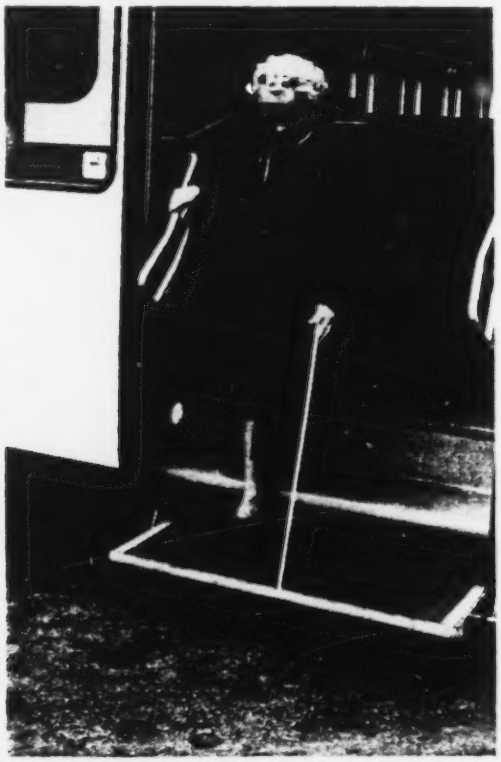
To comply with the regulations regarding the height of the steps at one entrance, kneeling buses have been introduced. This construction technique, applied to the ***front door*** of the bus, in combination with other regulations under the law (design of handrails, width of doorway and so forth), is the best possible solution to the problem of user adaptation today, with regard to ***boarding*** an existing standard bus.

Front door construction of a standard bus.

The regulations stipulate only the design of the front door of the bus. The middle and rear doors are not included. This is a serious omission since alighting from the bus normally occurs through either the middle or rear door. It is also well known that alighting from a bus is more difficult than boarding a bus.

An attempt to adapt a standard bus to better meet the needs of mobility impaired persons when ***alighting from the bus*** has been made. Improvements, requiring minimum alteration of the basic bus design and construction, were made at the ***middle door*** of a standard 12-meter (40-foot) bus.

An extra sliding step was installed so that it would project outside the bus when used at a bus stop. Such a construction implies an even step height of approximately 200 mm (8"). New handrails were also installed, designed to include an inclined rail to hold on to during the entire alighting procedure.



Middle door construction of a standard bus.

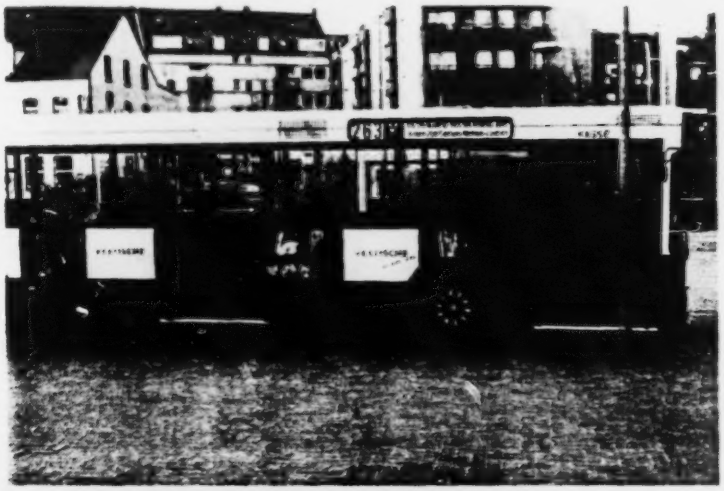
Effects

As regards the problems of alighting from the bus, the addition of an extra step makes the procedure easier because such a step bridges the otherwise difficult gap between the bus and the sidewalk. It also means that the step onto ground level is ***always*** a low one. This construction means a negation of the criticism of the law for having omitted

the most difficult problem — namely getting off the bus.

The new design of the middle door, though not an optimal solution, clearly demonstrates that it is technically possible to improve the comfort of elderly and disabled people on existing standard buses, and that conventional public transportation can be improved as a means of travel, especially for the older members of our society.

The solutions for the future, however, must be ***low-floor buses.*** A low-floor bus features a low floor between the front and middle doors of the bus, i.e. a bus ***without*** raised areas or steps inside the bus, and not simply a low entrance and a low gangway. Many bus manufactures in Europe began production in 1990, and low-floor buses are currently in use in several cities in Germany and the Netherlands and will be introduced in Sweden in early 1991.



Low-floor design of a standard bus.

Conclusions

This ***first level*** of a Community-responsive Public Transportation system aims at enabling people with a minor mobility impairment to use Traditional Fixed Route Service longer.

The introduction of a low-floor bus will be even more consistent with the first level of the differentiated adaptation approach to public transportation in Sweden, because such a bus fulfills more of the requirements of people with mobility impairments.

A low-floor bus also means that the normalization principle of Swedish policy can be better applied, since a low-floor bus does not require special equipment for a disabled person to board the vehicle. He or she can, to a greater extent, travel by bus with other members of society on more equal terms.

2.3 Service Route Traffic

Description

The ***second level*** of a Community-responsive Public Transportation system implies an introduction of a quite new ***regular*** public transportation network, ***Service Routes***. It should be pointed out at an early stage that Service Route traffic is ***one regular route network*** among others in a market-adapted public transportation system, and is thus ***not*** a separate, Special Transportation System wherein you have to meet eligibility requirements and call for, and often also pre-book, your trips.

The ***Service Route*** concept appeared in 1983 when the Borås Transportation Company introduced a new type of public transportation called Service Routes. It began as an experiment on one route during the summer months of 1983. The Service Route was adapted to the needs of the elderly and disabled by means of special route mapping, special timetables and smaller buses designed for disabled persons.

Planning a Service Route network requires particular care. Different districts in the urban area are inventoried according to demography, topography, destinations of particular interest, etc. In those sections of districts featuring a concentration of elderly people, the areas are thoroughly mapped before the bus routes are drawn. Whereas the conventional basic route network is usually constructed in the form of straight radial lines which quickly connect different residential areas with downtown center, the Service Route network has an entirely different configuration.

The Service Route network places priority on ***bringing the buses near the residents.*** This means that the routes wind through different residential areas, which in turn means that the distance to the bus stop (and hence the bus) is rather short. In addition, the bus drives up to entrances of service centers and various health facilities. Thus, Service Routes become an attractive means of transportation for people with various disabilities.

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The Service Route network also connects the various residential neighborhoods with the downtown area. One major difference, in addition to the actual configuration of the routes, is planning the timetable so that customers can enjoy more personal service than conventional public transportation can offer.

The Service Routes usually operate from 8-9 AM to 6-7 PM daily. There is hourly service on weekdays, which is often reduced to one departure every second hour on Sundays.

The planning of a Service Route must accommodate route layout, operating times, trip intervals, vehicles, and service, to meet the conditions and needs of the elderly and disabled. The following is a brief characterization and description of important components in the concept of Service Route traffic.

* ***Service Route traffic*** implies a ***compatible public transportation*** system which fulfills the requirement of ***integrating and accommodating*** the elderly and disabled in society. Service Route traffic is available to ***all*** presumptive bus passengers and is accessible to ***all*** people with functional impairments.

* ***Service Route traffic*** is ***a regular public transportation system*** with ***fixed trip intervals.*** It is a ***flexible*** transportation system wherein one does not need to plan or book a trip in advance. The ***timetables*** are adjusted to allow the traveller the time required for boarding and alighting, finding a seat, etc.

* ***Service Route traffic*** uses a ***route layout*** that assigns particular consideration to where elderly and disabled people live and where important destinations such as care centers, clinics, hospitals, shops etc are located.

* ***Service Route traffic*** features ***easy-access bus stops.*** Buses stop at the entrances to hospitals and care centers. The distance to bus stops in residential areas is minimized. You may even hale the bus outside your door.

* ***Service Route traffic*** utilizes ***thoroughfares*** such as pedestrian malls, broad bicycle paths and even market squares, that are not served by other traffic.

* ***Service Route traffic*** incorporate ***small*** and ***fully accessible vehicles*** with a capacity of about 20 seated passengers. The vehicle must be a low-floor bus without any height deviations inside, such as steps or platforms. The bus must also be able to kneel down to 200-230 mm (8-9") and have a ramp (not a lift) to accommodate wheelchair passengers.

* ***Service Route vehicles*** must be so constructed that the passengers feel ***close*** to the ***driver***, who must be able to provide ***personal service*** for passengers if required, e.g. when boarding and alighting.

Vehicle design for Service Route traffic.

The experiences gained from testing different buses in Borås prove that vehicle construction and design are ***very*** important to the Service Route concept. The vehicle must have the crucial features to facilitate travel by the elderly and people with impaired mobility, as described above.

If passenger requirements for vehicle design are not fulfilled, there is a great risk of not being able to achieve the otherwise palpable advantages of Service Route traffic; this is of special concern to the individual as well as to society. It is therefore important to design Service Route traffic - even in terms of vehicle design and construction - in line with the needs of those passengers who no longer have access to conventional public transit.

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Effects

Experiences from Service Route traffic to date in Sweden indicate that Service Routes can be introduced ***both*** to complement regular traffic ***and*** to provide an opportunity for many more people to use public transportation. Service Route Traffic thus creates conditions which generally improve the public transportation network for all groups of inhabitants. By late 1990, almost 40 cities in Sweden had introduced Service Route traffic.

Service Route traffic means considerably improved transportation possibilities for the ***elderly and disabled***. In areas where Service Routes are introduced, the number of elderly public transportation passengers increases generally between 10-15%. Even if this passenger group is already very dependent on public transportation, the introduction of Service Routes generates new passengers from this population segment who use the buses.

Furthermore, there is a remarkable increase in the number of STS-entitled persons using regular public transportation when Service Routes are available. More than half of those entitled to use Special Transportation Service choose Service Routes instead of STS, the primary reason being that Service Routes involve fewer problems, since it is not necessary to plan and order transportation in advance.

Service Route traffic designed in accordance with the criteria described above will thus mean, to the individual traveller, that:

* ***the stress element*** disappears in knowing that one has sufficient time to safely and confidently enter and leave the bus and find a seat;

* ***the difficulties*** associated with boarding and, especially, alighting are eliminated;

* ***the driver*** provides the required personal service and will help one enter and leave the bus if necessary;

* ***the size and design*** of the bus encourages social interaction among the passengers, who get to know one another, share conversation and help one another;

* ***the system*** provides the sense of security associated with travel that is necessary for certain people to use public transportation.

For the ***municipality and government*** the establishment of a Service Route in an area substantially reduces the dependence on STS, and the costs for this special service, by up to 25 - 40 %.

The number of passengers entitled to Special Transportation Services who use the Service Routes instead of STS increases over time. This generates considerable savings in the Special Transportation Service. The municipality pays around 10 SEK (1.5 US$) per trip when the STS- entitled person is using Service Route traffic, instead of 85 SEK (14 US$) per Special Transportation Service trip, i.e. a saving of more than 75 SEK (12 US$) per trip. The transportation company is thus reimbursed by the municipality corresponding to the cost of one public transportation trip for each passenger on the

Service Routes who is entitled to Special Transportation Services.

For the ***transportation company***, new customers start to use public transportation, and the number of passengers increases continuously. During a 2-3 year period the number of travellers on a Service Route usually more than doubles.

In Borås, where Service Routes were first introduced, ten different routes are currently in operation, covering the entire city. Here the Service Route traffic seems to be even more profitable than the conventional public transportation. As an example, the average number of passengers on the Traditional Fixed Route Service in Borås is approximately 2.0 passengers per kilometer travelled, compared to approximately 2.5 passengers on the Service Routes.

In comparing Service Routes to STS in Borås we also found that Service Routes carried on average 22 passengers per hour of service in comparison with approximately 2-3 passengers per hour of service for STS. Between 25-50% of the travellers on the Service Routes are entitled to STS. This figure varies between different routes. The above comparison provides a good indication that more people in the community were being served with the introduction of Service Routes.

Service Route traffic is a profitable form of public transportation. That fact is even more remarkable when one considers that this system has also:

* ***increased travel opportunities*** and improved comfort, not only for those entitled to STS, but even for others who find travelling difficult;

* ***given people entitled to STS better*** (according to their own accounts) ***transportation alternatives*** with greater freedom of choice than STS;

* ***contributed to increasing activity levels*** and breaking down the isolation of many elderly people.

Conclusions

The ***second level*** of Community-responsive Public Transportation is available for people who are in need of some extra time and service in connection with their transportation. Service Routes are available when the distances to the bus stops become too long and difficult to walk, and/or when the stresses and difficulties of boarding and alighting from the vehicle grow too formidable.

This means that when the Traditional Fixed Route Service doesn't function for you any longer you are not forced to be dependent on Special Transportation Service if you do not wish to be. You get a chance to ***choose*** and you are able to ***stay*** in an integrated public transportation service even if your mobility decreases.

The experiences from Service Routes clearly imply that the Swedish goal of integration and normalization in public transportation has become a reality for more people in the society, and up to a greater age for the elderly in general.

2.4 Special Transportation Service

Description

The ***third and last level*** in the Community-responsive Public Transportation system is Special Transportation Service. It is established policy in Sweden that this service should be regarded as a means of public transportation , even though it is a demand based service that requires eligibility and pre-booking of trips.

Sweden has a long tradition in providing Special Transportation Service. It was introduced in the late 1960's and was continuously developed during the 1970's. The provision of STS in 1979 in every municipality, in combination with a broader target group and an increasing number of elderly people, created rapid growth in the number of people who were entitled to use the service. It also meant that demand could not be satisfied with existing adapted vehicles, and therefore the municipalities began to subsidize trips by taxi. Today more than 90% of STS trips are made by taxi.

Special Transportation Service basically consists of subsidized ***door-to-door trips,*** including some personal assistance provided by the drivers of taxis or mini-buses. Beyond this basic level of service, each municipality decides how, when, and at what fare to provide service. These regulations vary considerably among municipalities.

Every municipality establishes its own rules for eligibility for Special Transportation Service. Some municipalities require a doctor's certificate stating that a person cannot cope with the existing public transportation and therefore is in need of STS. In other municipalities it is the appropriate staff at the local social agency that decide whether a person will be eligible or not to this service.

Generally, Special Transportation Service can be used for a variety of purposes, including trips to work, or studies, or leisure-time activities. Most municipalities do not allow the use of STS as a means of travel to health services, as these trips are subsidized by the National Health Insurance Program. In most municipalities there are no restrictions on how many trips you are allowed to make.

All municipalities limit the maximum distance of travel by STS in one way or another. One common restriction is that travel is limited to one's own municipality and a short distance (30-50 km) into adjacent municipalities. In Sweden's major urban areas, Stockholm, Gothenburg and Malmö, users are permitted to travel to all adjoining municipalities. Generally, STS seems to be intended for local travel only. It should be mentioned, however, that in addition to the local STS, Sweden also provides national Special Transportation Services which can be applied for separately.

Fares vary considerably among municipalities, but most charge 20% of the actual travel costs. In others the fare for the user is equivalent to the fare on the local public transit. As an average, the user pays around 15-18 SEK (2.5-3 $ US) per trip.

Mainly older people have difficulty using public transportation. Special Transportation Service has therefore become primarily a means of transportation for the elderly. Of the approximately 450,000 people eligible for STS, about 85% are over 65 years of age. Every fifth person over retirement age is entitled to use the service.

Developments during the past decade and future trends

The general trend of STS in the 1980's is one of continued expansion, both in expenditures and the number of users. The number of people who are entitled to use the service has grown from 280,000 in 1980 to 450,000 in 1989, representing an increase in the share of the total population from 3.5 % to over 5 %. All users have some form of mobility impairment which makes it difficult for them to travel by local public transit.

While the number of users has increased rapidly during the 1980's, the number of trips per person has been constant for several years. Each user averages 41 one-way trips per year, or less than one trip per week. This is a rather low figure considering that in most municipalities the user is allowed to travel as much as he or she wants to.

The rapid growth of the number of people who are entitled to use Special Transportation Service has resulted in a substantial increase in expenditures during the 1980's. In 1989, in total, 18.5 million trips were made in Sweden at a gross cost of 1.6 billion SEK (270,000,000 $ US). This means that a one-way trip using Special Transportation Service in Sweden cost 85 SEK (14 $ US) in 1989. The annual cost for STS per person entitled to STS is approximately 3,700 SEK (620 $ US).

Different efforts have been made to try to curtail the demand and costs for Special Transportation Service . During the 1970's, the eligibility restrictions were generally very liberal. The trend during the 1980's, however, was a minor increase in the restrictions. This is partly a result of increasing costs for STS and partly a result of better adapted public transportation, especially the introduction of Service Routes.

During the 1980's, several municipalities also raised the users' share to 25% or even 30%. During this period, users' organisations often demanded that STS fares and local public transit fares should be the same. In response to these demands some municipalities also changed their fare structure. Some of them even offered a monthly STS pass.

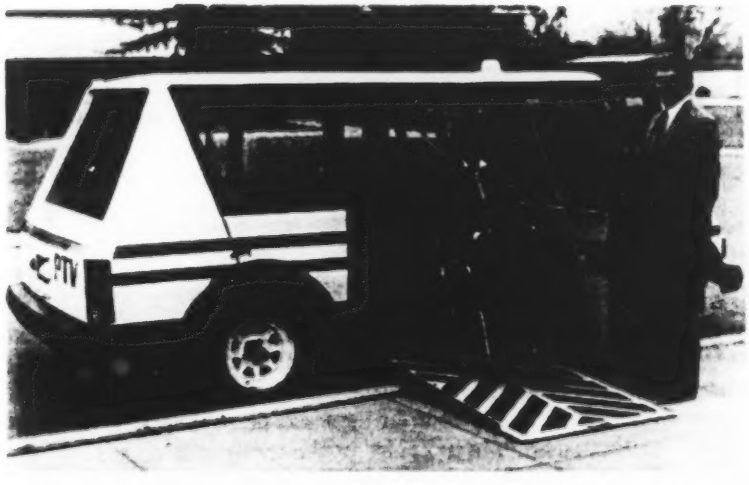
The different attempts to reduce the cost for STS that have become a reality during the 1980's show that changes in regulations affect the utilization of STS and thus the quality of service. The impact of changing the quality of service is, however, neither clear nor easy to predict. The effects of change differ from one municipality to the next, and it appears that municipalities can only handle the demand on STS in the short term.

Conclusions

The ***third level*** of Community-responsive Public Transportation is available when a person can no longer cope with any kind of regular public transportation. The Special Transportation Service has the possibility to offer the extra personal assistance to and from one's home which is not possible in a regular public transportation system. This special service is very important for many citizens who are more severely handicapped. Maintaining a high level of standards of the Special Transportation Service is therefore essential.

Even if the quality of service of the Special Transportation Service is very high compared with other countries, it is important that actions taken to curtail the demand must create a balance between the need to reduce costs and the needs of the mobility impaired person. Excessively high costs are not acceptable, but neither is a low quality of service. The most severely handicapped appear to be more affected than other users by changes in the quality of STS. Even if the adaptation of public transportation has made impressive progress in Sweden due to the mandatory legislation and the introduction of Service Routes, society still offers limited alternatives to meet the travel needs of the severely handicapped.

In this context, the importance of regulations for ***design*** of vehicles used for Special Transportation Service should be mentioned. The development and implementation of a low-floor vehicle attractive for both STS and ordinary taxi transportation is one important issue for the 1990's.



Vehicle design for Special Transportation Service in the 1990's.

The recognition of a more Community-responsive Public Transportation system that will guarantee a continued high quality of Special Transportation Service for those users who cannot use any adapted public transportation, not even the Service Routes, is another very important issue for the 1990's.

3 THE PROVISION OF ACCESSIBLE PUBLIC TRANSPORTATION IN THE FUTURE

It is likely that the trend toward more ***Community-responsive Public Transportation,*** and thus a more differentiated system, which has appeared in recent years in Sweden will continue to develop.

The experiences from the introduction of Service Route traffic have been so positive for everyone involved that the future of this form of transit seems secure. The development of Service Route traffic has been rapid. In Borås, where Service Route traffic was introduced in 1983, 11 Service Routes were operating by late 1990, which in effect means that Borås was first city with a comprehensive Service Route network. During the latest 2-3 years around ***40 cities*** in Sweden have started Service Route Traffic.

Service Route traffic will undoubtedly represent an important segment of future public transit in Swedish cities. Organizations representing the elderly and disabled are so satisfied with the experiences from Service Route traffic that they are beginning to exert pressure on politicians, municipal authorities and public transportation companies to introduce such service in more municipalities. Transit companies and municipal authorities also recognize the great potential, economically as well as from a service point of view, of Service Route traffic.

The introduction of Service Route traffic has also meant a recognition that adapting transportation systems to user groups ***cannot*** be done solely by making technical improvements in vehicles. ***The whole travel chain*** has to be taken into account. The success of Service Route traffic is based on the fact that this transportation, even if it is a form of regular public transportation, fulfills the requirement that a large proportion of elderly or other people with disabilities have all the means of transportation they can use.

The development of Service Routes has also become one important segment in the new philosophy regarding the provision of overall public transportation that emerged during the 1980's. The success of Service Routes, deriving from the philosophy of a ***market-adapted overall public transportation system,*** has encouraged many transportation companies to adopt this strategy — a strategy whereby the bus company cannot offer one and the same route network to all consumer groups. A differentiation of the route network is necessary to accommodate the different demands of different groups.

Looking back at the ***1980's,*** it is very tempting to describe ***Service Routes*** as the greatest development in public transportation during this past decade. Looking ahead into the ***1990's,*** it is very likely that this decade will be dedicated to the development of ***low-floor standard buses,*** 12 meter (40-foot) buses, and the introduction of these vehicles on the Swedish market. The solution for the future in the Traditional Fixed Route Service in urban areas must be the low-floor buses.

The introduction of a low floor standard bus in the Traditional Fixed Route Service means a great step towards the ***normalization*** and ***integration principle*** in Swedish policy, whose goal is the provision of transportation for the elderly and disabled. In

addition, it is an important component for also achieving better Community-responsive Public Transportation in the mainstream service in cities.

Since public transit can offer appropriate services to most of the elderly in society and some less severely disabled people, in the longer perspective there might be possibilities to ***lower the limitations on Special Transportation Services*** for the more severely handicapped. Thus, STS has the potential to become an even better, less expensive, more accessible means of transportation for these groups in the future.

The move to more Community-responsive Public Transportation has meant that a great proportion of the people in society with a very low access to transportation has been offered a possibility to ***choose*** between means of transportation. This is an important development and a great achievement, which has to be sustained. Most of us take getting about for granted, but for many elderly and disabled people, Community-responsive Public Transportation means having access to public transportation either for ***the first time,*** or for a longer period of time.

To maintain this feeling of normalization and integration that has become a reality to many elderly and disabled people during the past decade, it is essential that the success of Service Routes does not imply new restrictions in the quality of service in Special Transportation Service, such as tightened eligibility requirements, fewer trips, or higher fares. Remember that those great benefits in the use and costs of STS that were spun off from the introduction of Service Route traffic have been achieved on a ***volunteer basis;*** eligible STS-users have ***chosen*** to take the bus instead of using STS.

It is likely that this development will continue also because people with disabilities ***want*** to be able to use public transportation. It is a question of ***integration*** instead of ***separation.*** In addition, Service Route traffic offers other advantages that increase the quality of life of many elderly or disabled people, advantages that should be preserved.

The success of the many initiatives during the 1980's has implied a ***breakthrough in the attitude*** toward the adaptation of public transportation. The Swedish policy and the implementation of the 1979 law requiring the gradual adaptation of public transport vehicles and local terminals have manifestly had a great impact on this change in attitude. As a result, the 1990's will hopefully witness continued efforts to adapt the ***whole traffic and transport environment.***

One goal is to preserve and nourish this beginning change of attitude. It would be interesting if the provision of more Community-responsive Transportation Service could be regarded as a question of ***design*** of vehicles and the provision of ***comfortable*** transportation for everybody using the system, instead of a question of adaptation for a small segment of the population. While many of the solutions to provide accessible and ***good*** transportation benefit ***everyone,*** they are ***essential*** for this group to be able to use the system at all.

It would be desirable if this continuing change in attitude could imply greater ***human awareness*** — a recognition that if a person, due to a handicap or simply due to age, is ***not*** able to cope with the existing traffic/transport environment it is not because there is something wrong with the person. It is because there is something wrong with the way we plan this environment.

If there were awareness that there are ***human beings*** behind every figure and diagram used to describe the existing situations (difficulties, needs and so forth) of people with mobility or other disabilities, and to describe the benefits of measures taken, that would mean a great step forward. Perhaps we need to be reminded that we can all very suddenly belong to this group. It can happen very suddenly if we are unlucky, and it ***will*** certainly happen to us all if we are lucky and live a long life.

The experiences of one decade of studies and solutions aimed at providing more adequate transportation for all citizens, including the elderly and disabled, indicate that access to public transportation can be improved by more ***conscientious, better-informed*** planning of the system. For many people, it implies not only improved mobility but also a heightened ***quality of life***. Let the new motto for the 1990's in providing more Community-responsive Public Transportation be ***design and comfort for everybody in the whole transportation chain***. Such an attitude would mean a real recognition of the goal of Swedish policy, namely integration and normalization for everybody in society.

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Providing Transportation for the Elderly and Handicapped in Sweden

This report is a synopsis of the results of R&D projects concerning disabled people and transportation carried out at the Department of Traffic Planning and Engineering in Lund, Sweden.

The projects have concentrated primarily on ascertaining how the users, i.e. elderly and disabled people, have been affected by the legislation and other, local, initiatives to adapt public transportation.

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Swedish Transport Research Board

The Swedish Transport Research Board (TFB) is a government organization with supervisory and coordinating functions in Swedish transport research. TFB plans, supports, and initiates research work and informs about research development in the field of transportation and traffic.

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